

**Joint Polar Satellite System (JPSS) Ground Project**

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**Joint Polar Satellite System (JPSS)  
Algorithm Specification Volume I:  
Software Requirement Specification (SRS)  
for the OMPS Nadir Profile RDR/SDR**

**Block 2.0.0**



National Aeronautics and  
Space Administration

**Goddard Space Flight Center  
Greenbelt, Maryland**

# **Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirement Specification (SRS) for the OMPS Nadir Profile RDR/SDR JPSS Review/Approval Page**

## **Prepared By:**

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JPSS Ground System  
(Electronic Approvals available online at [https://jpssmis.gsfc.nasa.gov/frontmenu\\_dsp.cfm](https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm))

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**Goddard Space Flight Center  
Greenbelt, Maryland**

## **Preface**

This document is under JPSS Ground Project configuration control. Once this document is approved, JPSS approved changes are handled in accordance with Class I and Class II change control requirements as described in the JPSS Configuration Management Procedures, and changes to this document shall be made by complete revision.

Any questions should be addressed to:

JPSS Configuration Management Office  
NASA/GSFC  
Code 474  
Greenbelt, MD 20771

## Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)
Rev-	August 22, 2013	This version incorporates 474-CCR-13-1124 which was approved by JPSS Ground ERB on the effective date shown.
A	Jan 9, 2014	This version incorporates 474-CCR-13-1350 which was approved by JPSS Ground ERB on the effective date shown.
A1	Oct 23, 2014	This version incorporates 474-CCR-14-2091 which was approved by the JPSS Ground ERB for CO10 on the effective date shown.
B	Oct 23, 2014	This version incorporates 474-CCR-14-1721, 474-CCR-14-1741, 474-CCR-14-1781, 474-CCR-14-2110 and 474-CCR-14-2073 which was approved by JPSS Ground ERB on the effective date shown.
C	Mar 29, 2016	This version incorporates 474-CCR-15-2452, 474-CCR-15-2480, 474-CCR-15-2657, and 474-CCR-16-2818 which was approved by JPSS Ground ERB on the effective date shown.
0200D	Sep 22, 2016	This version incorporates 474-CCR-16-2939 and 474-CCR-16-3049 which was approved by JPSS Ground ERB on the effective date shown.
0200E	Jan 11, 2017	This version incorporates 474-CCR-16-3180 which was approved by JPSS Ground ERB on the effective date shown.

**Table of TBDs/TBRs**

<b>TBx</b>	<b>Type</b>	<b>ID</b>	<b>Text</b>	<b>Action</b>
<b>None</b>				

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## 1 Introduction

The Joint Polar Satellite System (JPSS) is the National Oceanic and Atmospheric Administration's (NOAA) next-generation operational Earth observation program that acquires and distributes global environmental data primarily from multiple polar-orbiting satellites. The program plays a critical role in NOAA's mission to understand and predict changes in weather, climate, oceans and coasts, and the space environment, which support the Nation's economy and protect lives and property. The first JPSS satellite mission, the Suomi National Polar-orbiting Partnership (S-NPP) satellite, successfully launched in October 2011. S-NPP, along with the legacy NOAA Polar Operational Environmental Satellites (POES), provides continuous environmental observations. Two JPSS satellites will follow S-NPP: JPSS-1, planned for launch in fiscal year (FY) 2017, with JPSS-2 to follow in FY2021. In the future, the JPSS Polar Follow-On (PFO) provides for two additional missions, JPSS-3 and JPSS-4, as follow-on to the JPSS-2 mission to extend the JPSS Program lifecycle out to 2038.

In addition to the JPSS Program's own satellites operating in the 1330 ( $\pm 10$ ) Local Time of the Ascending Node (LTAN) orbit, NOAA also leverages mission partner assets for complete global coverage. These partner assets include the Department of Defense (DoD) Defense Meteorological Satellite Program (DMSP) operational weather satellites (in the 1730 - 1930 LTAN orbit), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Meteorological Operational (Metop) satellites (in the 2130 LTAN orbit) and the Japanese Aerospace Exploration Agency (JAXA) Global Change Observation Mission-Water (GCOM-W) satellite (in the 1330 LTAN orbit). JPSS routes Metop data from McMurdo Station, Antarctica to the EUMETSAT facility in Darmstadt, Germany and EUMETSAT, in turn, provides Metop data to NOAA. For GCOM, JPSS routes the GCOM-W data from Svalbard, Norway to the NOAA Satellite Operations Facility (NSOF) in Suitland, MD, processes GCOM-W data and delivers GCOM-W products to the JPSS users who have JAXA permissions.

Additionally, the JPSS Program provides data acquisition and routing support to the DMSP and the WindSat Coriolis Program. JPSS routes DMSP data from McMurdo Station to the 557<sup>th</sup> Weather Wing at Offutt Air Force Base in Omaha, NE. After processing, the 557<sup>th</sup> releases the DMSP data for public consumption over the Internet via the National Centers for Environment Information (NCEI) in Boulder, CO. The JPSS Program provides data routing support to the National Science Foundation (NSF), as well as the National Aeronautics and Space Administration (NASA) Space Communications and Navigation (SCaN)-supported missions, which include the Earth Observing System (EOS). As part of the agreements for the use of McMurdo Station, JPSS provides communications/network services for the NSF between McMurdo Station, Antarctica and Centennial, Colorado.

As a multi-mission ground infrastructure, the JPSS Ground System supports the heterogeneous constellation of the before-mentioned polar-orbiting satellites both within and outside the JPSS Program through a comprehensive set of services as listed in Table 1-1.



**Table: 1-1 JPSS Ground System Services**

Service	Description
Enterprise Management and Ground Operations	Provides mission management, mission operations, ground operations, contingency management and system sustainment
Flight Operations	Provides launch support and early orbit operations, telemetry and commanding, orbital operations, mission data playback, payload support, flight software upgrade, flight vehicle simulation, and disposal at the end of mission life
Data Acquisition	Provides space/ground communications for acquiring mission data
Data Routing	Provides routing of telemetry, mission and/or operations data through JPSS' global data network
Data Product Generation	Provides the processing of mission data to generate and distribute raw, sensor, environmental, and ancillary data products
Data Product Calibration and Validation	Provides calibration and validation of the data products
Field Terminal Support	Provides development and operational support to the Field Terminal customers

## 1.1 Identification

This SRS provides requirements for OMPS (Ozone Mapping and Profiler Suite) Nadir Profile (NP) Raw Data Records (RDRs) and Sensor Data Records (SDRs). OMPS measures stratospheric ozone through the measurement of backscattered ultraviolet (UV) light. OMPS Nadir (OMPS-N) system consists of two instruments, a Nadir Total Column Mapper (NM) and a Nadir Profiler (NP). The Nadir Profiler sensor has a focal plane UV grating spectrometer that provides measurements between 250 to 310 nm (252-306 for S-NPP) nm, with a spectral resolution of 1 nm.

## 1.2 Algorithm Overview

The Nadir Profile (NP) ozone SDR is generated from the RDR for the nadir profile focal plane of the OMPS instrument. The SDR processing produces an earth-scene SDR from the backscatter of solar radiation. The nadir profile earth scene SDR provides raw counts, count corrections, and calibrated earth and sun radiances for subsequent EDR processing into a measurement of ozone profile. The OMPS system will produce two JPSS EDRs, Ozone Total Column (TC) and Ozone Nadir Profile (NP).

The OMPS algorithms include the following:

1. The Nadir Total Column Ozone SDR algorithm
2. The Nadir Profile Ozone SDR algorithm
3. The Nadir Total Column Ozone Algorithm
4. The Nadir Profile Ozone Algorithm

## 1.3 Document Overview

Section	Description
Section 1	Introduction - Provides a brief overview of the JPSS Ground System and the relevant algorithm, as reference material only.
Section 2	Related Documentation - Lists related documents and identifies them as Parent, Applicable, or Information Documents such as, MOAs, MOUs, technical implementation agreements, as well as Data Format specifications. This section also establishes an order of precedence in the event of conflict between two or more documents.

Section	Description
Section 3	Algorithm Requirements - Provides a summary of the science requirements for the products covered by this volume.
Appendix A	Requirements Attributes - Provides the mapping of requirements to verification methodology and attributes.

## 2 Related Documentation

The latest JPSS documents can be obtained from URL:

[https://jpssmis.gsfc.nasa.gov/frontmenu\\_dsp.cfm](https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm). JPSS Project documents have a document number starting with 470, 472 or 474 indicating the governing Configuration Control Board (CCB) (Program, Flight, or Ground) that has the control authority of the document.

### 2.1 Parent Documents

The following reference document(s) is (are) the Parent Document(s) from which this document has been derived. Any modification to a Parent Document will be reviewed to identify the impact upon this document. In the event of a conflict between a Parent Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Doc. No.	Document Title
470-00067	Joint Polar Satellite System (JPSS) Ground System Requirements Document (GSRD)
470-00067-02	Joint Polar Satellite System (JPSS) Ground System Requirements Document (GSRD) Volume 2 - Science Product Specification
474-00448-01-01	Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirements Specification (SRS) for the Common Algorithms

### 2.2 Applicable Documents

The following document(s) is (are) the Applicable Document(s) from which this document has been derived. Any modification to an Applicable Document will be reviewed to identify the impact upon this document. In the event of conflict between an Applicable Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Doc. No.	Document Title
D0001-M01-S01-005	Joint Polar Satellite System (JPSS) Algorithm Specification for OMPS Nadir Profile Ozone Algorithm Theoretical Basis Document (ATBD)
474-00448-02-05	Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for OMPS Nadir Profile RDR/SDR
474-00448-04-05	Joint Polar Satellite System (JPSS) Algorithm Specification Volume IV: Software Requirements Specification Parameter File (SRSPF) for OMPS Nadir Profile RDR/SDR

### 2.3 Information Documents

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of this document.

Doc. No.	Document Title
474-00333	Joint Polar Satellite System (JPSS) Ground System (GS) Architecture Description Document (ADD)
474-00054	Joint Polar Satellite System (JPSS) Ground System (GS) Concept of Operations (ConOps)
470-00041	Joint Polar Satellite System (JPSS) Program Lexicon

Doc. No.	Document Title
474-00448-03-05	Joint Polar Satellite System (JPSS) Algorithm Specification Volume III: Operational Algorithm Description (OAD) for the OMPS Nadir Profile RDR/SDR
429-05-02-42	Joint Polar Satellite System (JPSS) Mission Data Format Control Book National Polar-Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) (MDFCB)
472-00251	Joint Polar Satellite System (JPSS) Mission Data Format Control Book for JPSS-1
472-00331	Joint Polar Satellite System-1 (JPSS-1) Ozone Mapping and Profiler Suite (OMPS) Mission Data Packet Structures

### 3 Algorithm Requirements

#### 3.1 States and Modes

##### 3.1.1 Normal Mode Performance

SRS.01.05\_321 The OMPS Nadir Profile algorithm shall calculate the earth view radiance holding the out-of-band stray light to less than 1%.

*Rationale:* The limiting value of the out-of-band stray light was flowed down from Level 1 and Level 2 documents.

*Mission Effectivity:* JPSS-1, JPSS-2

SRS.01.05\_322 The OMPS Nadir Profile algorithm shall calculate the earth view radiance over the wavelength range of 252 to 306 nm.

*Rationale:* The wavelength range of the earth view radiance was flowed down from the Level 1 and Level 2 documents.

*Mission Effectivity:* S-NPP

SRS.01.05\_323 The OMPS Nadir Profile algorithm shall calculate the earth view radiance with a horizontal cell size of 250 km at nadir.

*Rationale:* The horizontal cell size at nadir was flowed down from Level 1 and Level 2 documents.

*Mission Effectivity:* S-NPP

SRS.01.05\_328 The OMPS Nadir Profile algorithm shall calculate the earth view radiance with an albedo calibration accuracy of 2%.

*Rationale:* The accuracy values of the earth view radiance with an albedo calibration were flowed down from the Level 1 and Level 2 documents.

*Mission Effectivity:* JPSS-1, JPSS-2

SRS.01.05\_329 The OMPS Nadir Profile algorithm shall calculate the earth view radiance with pixel-to-pixel calibration accuracy of 1% maximum.

*Rationale:* The accuracy values of the earth view radiance with pixel-to-pixel calibration were flowed down from the Level 1 and Level 2 documents.

*Mission Effectivity:* JPSS-1, JPSS-2

SRS.01.05\_469 The OMPS Nadir Profile algorithm shall calculate the earth view radiance over the wavelength range of 250 to 310 nm.

*Rationale:* The wavelength range of the earth view radiance was flowed down from the Level 1 and Level 2 documents.

*Mission Effectivity:* JPSS-1, JPSS-2

SRS.01.05\_470 The OMPS Nadir Profile algorithm shall calculate the earth view radiance with a horizontal cell size of 50 km at nadir.

*Rationale:* The horizontal cell size at nadir was flowed down from Level 1 and Level 2 documents.

*Mission Effectivity:* JPSS-1, JPSS-2

SRS.01.05\_471 The OMPS Nadir Profile SDR Geolocation algorithm computation shall have a one-sigma mapping uncertainty of no more than 25 km.

*Rationale:* From L1RD requirements for Ozone NP EDR.

*Mission Effectivity:* S-NPP, JPSS-1

### **3.1.2 Graceful Degradation Mode Performance**

Not applicable.

## **3.2 Algorithm Functional Requirements**

Not applicable.

### **3.2.1 Product Production Requirements**

Not applicable.

### **3.2.2 Algorithm Science Requirements**

SRS.01.05\_324 The OMPS Nadir Profile SDR software shall incorporate a computing algorithm provided for earth-view radiances.

*Rationale:* The Nadir Profile earth-view radiance data is one of OMPS NP SDR products. The SDR software through its computing algorithm must produce the NP earth view radiance data in accordance with the JPSS Algorithm Specification for OMPS Nadir Profile Ozone ATBD (D0001-M01-S01-005).

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

### **3.2.3 Algorithm Exception Handling**

SRS.01.05\_80 The OMPS Nadir Profile SDR software shall set the <FillField> values to <FillValue> for <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_Science\_SDR><fill>.

*Rationale:* The SDR software through its computing algorithm must fill the OMPS NP SDR values based on the established fill conditions to satisfy exclusion and fill conditions.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

### 3.3 External Interfaces

#### 3.3.1 Inputs

SRS.01.05\_74 The OMPS Nadir Profile SDR software shall incorporate inputs specified in Table 3-1.

*Rationale:* The SDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended OMPS NP Science SDR products.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_114 The OMPS Nadir Profile SDR GEO software shall incorporate inputs specified in Table 3-1.

*Rationale:* The SDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended OMPS NP SDR Geolocation products.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_472 The OMPS Nadir Profile SDR software shall ingest tables and coefficients formatted in accordance with Section 7 of the JPSS Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).

*Rationale:* This defines the formats for Lookup Tables, and Processing Coefficients for input into the algorithm module.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

Table 3-1 and Figure 3-1 are best viewed together since they describe the processes governed by this SRS in different ways. The figure diagrams the data flowing into, out of, and within the code governed by this SRS. The table lists these same data interactions as well as all downstream dependencies for outputs from this SRS.

Each row in the table describes a single software interaction - data flowing from one software item to another. The data is listed in the first column. The second and third columns include the short name and mnemonic for the data. Blanks indicate there is no mnemonic. The fourth and fifth columns contain the SRS that generates the data product(s) in the first column, and the SRS that receives those products. The final two columns contain the actual function name in Algorithm Development Library (ADL) that produces those products, and the function that inputs those products. The SRS's titled "Ingest MSD" and "Store/Retrieve" are non-existent SRS's functioning as data handling for the IDPS. The software functions "Store Products" and "Retrieve Products" are similar non-existent functions that operate as IDPS data handling. See Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for OMPS Nadir Profile RDR/SDR (474-00448-02-05) to find products allocated to IDPS.

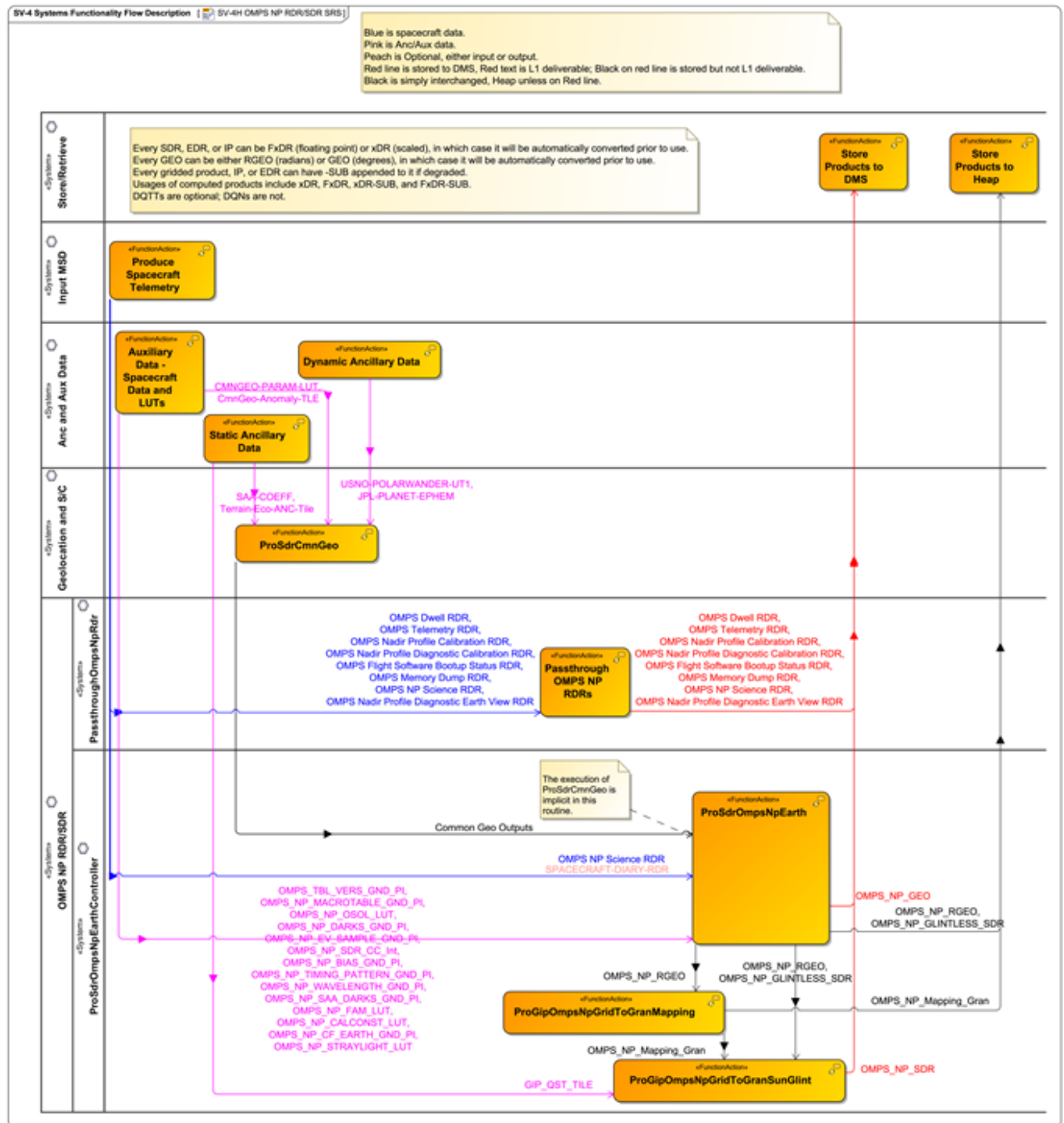


Figure: 3-1 OMPS NP RDR/SDR Data Flows



**Table: 3-1 SV-6 Systems Resource Flow Matrix: OMPS NP RDR/SDR**

	<b>Data Product Name</b>	<b>Collection Short Name</b>	<b>Mnemonic</b>	<b>Sending Function</b>	<b>Receiving Function</b>	<b>Sending SRS</b>	<b>Receiving SRS</b>
1	<ul style="list-style-type: none"> <li>•OMPS Dwell RDR</li> <li>•OMPS Telemetry RDR</li> <li>•OMPS Nadir Profile Calibration RDR</li> <li>•OMPS Nadir Profile Diagnostic Calibration RDR</li> <li>•OMPS Flight Software Bootup Status RDR</li> <li>•OMPS Memory Dump RDR</li> <li>•OMPS NP Science RDR</li> <li>•OMPS Nadir Profile Diagnostic Earth View RDR</li> </ul>	<ul style="list-style-type: none"> <li>•OMPS-DWELL-RDR</li> <li>•OMPS-TELEMETRY-RDR</li> <li>•OMPS-NPCALIBRATION-RDR</li> <li>•OMPS-NPDIAGCAL-RDR</li> <li>•OMPS-FSWBU-RDR</li> <li>•OMPS-DUMP-RDR</li> <li>•OMPS-NPSCIENCE-RDR</li> <li>•OMPS-NPDIAGNOSTIC-RDR</li> </ul>	<ul style="list-style-type: none"> <li>•RDRE-OMPS-C0036</li> <li>•RDRE-OMPS-C0034</li> <li>•RDRE-OMPS-C0037</li> <li>•RDRE-OMPS-C0053</li> <li>•RDRE-OMPS-C0057</li> <li>•RDRE-OMPS-C0035</li> <li>•RDRE-OMPS-C0030</li> <li>•RDRE-OMPS-C0052</li> </ul>	Produce Spacecraft Telemetry	Passthrough OMPS NP RDRs	Input MSD	OMPS NP RDR/SDR
2	•SPACECRAFT-DIARY-RDR	•SPACECRAFT-DIARY-RDR	•RDRE-SCAE-C0030	Produce Spacecraft Telemetry	ProSdrOmpsN pEarth	Input MSD	OMPS NP RDR/SDR
3	•OMPS NP Science RDR	•OMPS-NPSCIENCE-RDR	•RDRE-OMPS-C0030	Produce Spacecraft Telemetry	ProSdrOmpsN pEarth	Input MSD	OMPS NP RDR/SDR
4	<ul style="list-style-type: none"> <li>•OMPS_TBL_VERS_GND_PI</li> <li>•OMPS_NP_MACROTABLE_GND_PI</li> <li>•OMPS_NP_OSOL_LUT</li> <li>•OMPS_NP_DARKS_GND_PI</li> <li>•OMPS_NP_EV_SAMPLE_GND_PI</li> <li>•OMPS_NP_SDR_CC_Int</li> <li>•OMPS_NP_BIAS_GND_PI</li> <li>•OMPS_NP_TIMING_PATTE</li> <li>•OMPS_NP_EV_SAMPLE-GND-PI</li> </ul>	<ul style="list-style-type: none"> <li>•OMPS-TBL-VERS-GND-PI</li> <li>•OMPS-NP-MACROTABLE-GND-PI</li> <li>•OMPS-NP-OSOL-LUT</li> <li>•OMPS-NP-DARKS-GND-PI</li> <li>•OMPS-NP-EV-SAMPLE-GND-PI</li> </ul>	<ul style="list-style-type: none"> <li>•NP_NU-LM0240-130</li> <li>•NP_NU-LM0240-122</li> <li>•NP_NU-LM0240-110</li> <li>•NP_NU-LM0240-134</li> <li>•NP_NU-LM0240-121</li> </ul>	Auxiliary Data - Spacecraft Data and LUTs	ProSdrOmpsN pEarth	Anc and Aux Data	OMPS NP RDR/SDR

	Data Product Name	Collection Short Name	Mnemonic	Sending Function	Receiving Function	Sending SRS	Receiving SRS
	<ul style="list-style-type: none"> <li>•OMPS_NP_WAVELENGTH_GND_PI</li> <li>•OMPS_NP_SAA_DARKS_GND_PI</li> <li>•OMPS_NP_FAM_LUT</li> <li>•OMPS_NP_CALCONST_LUT</li> <li>•OMPS_NP_CF_EARTH_GND_PI</li> <li>•OMPS_NP_STRAYLIGHT_LUT</li> </ul>	<ul style="list-style-type: none"> <li>•OMPS-NP-SDR-CC</li> <li>•OMPS-NP-BIAS-GND-PI</li> <li>•OMPS-NP-TIMING-PATTERN-GND-PI</li> <li>•OMPS-NP-WAVELENGTH-GND-PI</li> <li>•OMPS-NP-SAA-DARKS-GND-PI</li> <li>•OMPS-NP-FAM-LUT</li> <li>•OMPS-NP-CALCONST-LUT</li> <li>•OMPS-NP-CF-EARTH-GND-PI</li> <li>•OMPS-NP-STRAYLIGHT-LUT</li> </ul>	<ul style="list-style-type: none"> <li>•DP_NU-LM2020-004</li> <li>•NP_NU-LM0240-136</li> <li>•NP_NU-LM0240-119</li> <li>•NP_NU-LM0240-125</li> <li>•NP_NU-LM0240-135</li> <li>•NP_NU-LM0240-109</li> <li>•NP_NU-LM0240-108</li> <li>•NP_NU-LM0240-127</li> <li>•NP_NU-LM0240-137</li> </ul>				
5	•GIP_QST_TILE	•GridIP-VIIRS-Qst-Quarterly-Tile	•IMPI_QSIP_R0010	Static Ancillary Data	ProGipOmpsNpGridToGranSunGlint	Anc and Aux Data	OMPS NP RDR/SDR
6	•Common Geo Outputs	•None	•None	ProSdrCmnGeo	ProSdrOmpsNpEarth	Geolocation and S/C	OMPS NP RDR/SDR
7	•OMPS_NP_RGEO	•OMPS-NP-RGEO	•None	ProSdrOmpsNpEarth	ProGipOmpsNpGridToGranMapping	OMPS NP RDR/SDR	OMPS NP RDR/SDR
8	<ul style="list-style-type: none"> <li>•OMPS_NP_RGEO</li> <li>•OMPS_NP_GLINTLESS_SDR</li> </ul>	<ul style="list-style-type: none"> <li>•OMPS-NP-RGEO</li> <li>•OMPS-NP-Glintless-SDR</li> </ul>	<ul style="list-style-type: none"> <li>•None</li> <li>•None</li> </ul>	ProSdrOmpsNpEarth	ProGipOmpsNpGridToGranSunGlint	OMPS NP RDR/SDR	OMPS NP RDR/SDR
9	•OMPS_NP_Mapping_Gran	•OMPS-NP-Grid-To-Gran-GridIP-Mapping-IP	•None	ProGipOmpsNpGridToGranMapping	ProGipOmpsNpGridToGranSunGlint	OMPS NP RDR/SDR	OMPS NP RDR/SDR

	<b>Data Product Name</b>	<b>Collection Short Name</b>	<b>Mnemonic</b>	<b>Sending Function</b>	<b>Receiving Function</b>	<b>Sending SRS</b>	<b>Receiving SRS</b>
10	•OMPS_NP_SDR	•OMPS-NP-SDR	•SDRE-OMPS-C0030	ProGipOmpsNpGridToGranSunGlint	Store Products to DMS	OMPS NP RDR/SDR	Store/Retrieve
11	•OMPS Dwell RDR •OMPS Telemetry RDR •OMPS Nadir Profile Calibration RDR •OMPS Nadir Profile Diagnostic Calibration RDR •OMPS Flight Software Bootup Status RDR •OMPS Memory Dump RDR •OMPS NP Science RDR •OMPS Nadir Profile Diagnostic Earth View RDR	•OMPS-DWELL-RDR •OMPS-TELEMETRY-RDR •OMPS-NPCALIBRATION-RDR •OMPS-NPDIAGCAL-RDR •OMPS-FSWBU-RDR •OMPS-DUMP-RDR •OMPS-NPSCIENCE-RDR •OMPS-NPDIAGNOSTIC-RDR	•RDRE-OMPS-C0036 •RDRE-OMPS-C0034 •RDRE-OMPS-C0037 •RDRE-OMPS-C0053 •RDRE-OMPS-C0057 •RDRE-OMPS-C0035 •RDRE-OMPS-C0030 •RDRE-OMPS-C0052	Passthrough OMPS NP RDRs	Store Products to DMS	OMPS NP RDR/SDR	Store/Retrieve
12	•OMPS_NP_GEO	•OMPS-NP-GEO	•None	ProSdrOmpsNpEarth	Store Products to DMS	OMPS NP RDR/SDR	Store/Retrieve
13	•OMPS_NP_Mapping_Gran	•OMPS-NP-Grid-To-Gran-GridIP-Mapping-IP	•None	ProGipOmpsNpGridToGranMapping	Store Products to Heap	OMPS NP RDR/SDR	Store/Retrieve
14	•OMPS_NP_RGEO •OMPS_NP_GLINTLESS_SDR	•OMPS-NP-RGEO •OMPS-NP-Glintless-SDR	•None •None	ProSdrOmpsNpEarth	Store Products to Heap	OMPS NP RDR/SDR	Store/Retrieve

### 3.3.2 Outputs

SRS.01.05\_59 The OMPS RDR software shall generate the OMPS Nadir Profile Diagnostic Calibration RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_RDR><DiagCal>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_60 The OMPS RDR software shall generate the OMPS Nadir Profile Diagnostic Earth View RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_RDR><DiagEarthView>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_61 The OMPS RDR software shall generate the OMPS Nadir Profile Science RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_RDR><Science>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_62 The OMPS RDR software shall generate the OMPS Nadir Profile Calibration RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_RDR><Cal>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_63 The OMPS RDR software shall generate the OMPS Diagnostic Flight Software Bootup Status RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General\_RDR><FSWBUSat>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_64 The OMPS RDR software shall generate the OMPS Memory Dump RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General\_RDR><MemDump>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_65 The OMPS RDR software shall generate the OMPS Telemetry RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General\_RDR><Telemetry>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_66 The OMPS RDR software shall generate the OMPS Dwell Telemetry RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General\_RDR><DwellTelem>.

*Rationale:* The RDR is one of OMPS NP RDR products and is generated from the specified mission data packet APIDs. APIDs associated with the Spacecraft Diary, as defined in the JPSS Algorithm Specification Vol IV: SRS Parameter File for Geolocation and Spacecraft Orientation (474-00448-04-08), are included in the deliverable RDR.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_72 The OMPS Nadir Profile SDR software shall generate the OMPS NP Science SDR, conforming to the XML format file in Attachment A.1 of the JPSS

Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).

*Rationale:* The product profile must conform to the XML format file.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_113 The OMPS Nadir Profile SDR software shall generate the OMPS Nadir Profile Science SDR geolocation in conformance with the XML format file in Attachment A.4 of the JPSS Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).

*Rationale:* The product profile must conform to the XML format file.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

### **3.4 Science Standards**

Not applicable.

### **3.5 Metadata Output**

Not applicable.

### **3.6 Quality Flag Content Requirements**

SRS.01.05\_89 The OMPS Nadir Profile SDR software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP\_Science\_SDR><QF>.

*Rationale:* Quality Flags must be generated based on the established flag conditions, logic, and format.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_326 The OMPS Nadir Profile SDR GEO software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the SRSPF <NP\_Sci\_GEO><QF>.

*Rationale:* Quality Flags must be generated based on the established flag conditions, logic, and format.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

### **3.7 Reserved**

### **3.8 Adaptation**

Not applicable.

### **3.9 Provenance Requirements**

Not applicable.

### **3.10 Computer Software Requirements**

Not applicable.

### **3.11 Software Quality Characteristics**

Not applicable.

### **3.12 Design and Implementation Constraints**

SRS.01.05\_335 The JPSS Common Ground System shall execute the OMPS NP earth-view radiance computing algorithm.

*Rationale:* The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

SRS.01.05\_337 The JPSS Common Ground System shall execute the OMPS NP geolocation algorithm.

*Rationale:* The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

*Mission Effectivity:* S-NPP, JPSS-1, JPSS-2

### **3.13 Personnel Related Requirements**

Not applicable.

### **3.14 Training Requirements**

Not applicable.

### **3.15 Logistics Related requirements**

Not applicable.

### **3.16 Other Requirements**

Not applicable.

### **3.17 Packaging Requirements**

Not applicable.

### **3.18 Precedence and Criticality**

Not applicable.

**Appendix A. Requirements Attributes**

The Requirements Attributes Table lists each requirement with CM-controlled attributes including requirement type, mission effectivity, requirement allocation(s), block start and end, method(s) for verifying each requirement, etc.

Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
SRS.01.05_321	The OMPS Nadir Profile algorithm shall calculate the earth view radiance holding the out-of-band stray light to less than 1%.	P	SDR	JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_322	The OMPS Nadir Profile algorithm shall calculate the earth view radiance over the wavelength range of 252 to 306 nm.	P	SDR	S-NPP	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_323	The OMPS Nadir Profile algorithm shall calculate the earth view radiance with a horizontal cell size of 250 km at nadir.	P	SDR	S-NPP	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_328	The OMPS Nadir Profile algorithm shall calculate the earth view radiance with an albedo calibration accuracy of 2%.	P	SDR	JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_329	The OMPS Nadir Profile algorithm shall calculate the earth view radiance with pixel-to-pixel calibration accuracy of 1% maximum.	P	SDR	JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_469	The OMPS Nadir Profile algorithm shall calculate the earth view radiance over the	P	SDR	JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Test	NA	NA



Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
	wavelength range of 250 to 310 nm.									
SRS.01.05_470	The OMPS Nadir Profile algorithm shall calculate the earth view radiance with a horizontal cell size of 50 km at nadir.	P	SDR	JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_471	The OMPS Nadir Profile SDR Geolocation algorithm computation shall have a one-sigma mapping uncertainty of no more than 25 km.	P	GEO	S-NPP JPSS-1	algorithm provider	2.0.0	3.0.0	Test	NA	NA
SRS.01.05_324	The OMPS Nadir Profile SDR software shall incorporate a computing algorithm provided for earth-view radiances.	Ap	SDR	S-NPP JPSS-1 JPSS-2	algorithm provider	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_80	The OMPS Nadir Profile SDR software shall set the <FillField> values to <FillValue> for <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_Science_SDR><fill>.	E	SDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_74	The OMPS Nadir Profile SDR software shall incorporate inputs specified in Table 3-1.	I	SDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_114	The OMPS Nadir Profile SDR GEO software shall incorporate inputs specified in Table 3-1.	I	GEO	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_472	The OMPS Nadir Profile SDR software shall ingest tables and	Ft	SDR	S-NPP JPSS-1	CGS	2.0.0	3.0.0	Inspection	NA	NA

Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
	coefficients formatted in accordance with Section 7 of the JPSS Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).			JPSS-2						
SRS.01.05_59	The OMPS RDR software shall generate the OMPS Nadir Profile Diagnostic Calibration RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_RDR><DiagCal>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_60	The OMPS RDR software shall generate the OMPS Nadir Profile Diagnostic Earth View RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_RDR><DiagEarthView>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_61	The OMPS RDR software shall generate the OMPS Nadir Profile Science RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_RDR><Science>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA

Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
SRS.01.05_62	The OMPS RDR software shall generate the OMPS Nadir Profile Calibration RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_RDR><Cal>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_63	The OMPS RDR software shall generate the OMPS Diagnostic Flight Software Bootup Status RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General_RDR><FSWBUSat>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_64	The OMPS RDR software shall generate the OMPS Memory Dump RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General_RDR><MemDump>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_65	The OMPS RDR software shall generate the OMPS Telemetry RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA

Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
	(474-00448-04-05) <General_RDR><Telemetry>.									
SRS.01.05_66	The OMPS RDR software shall generate the OMPS Dwell Telemetry RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <General_RDR><DwellTelem>.	F	RDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_72	The OMPS Nadir Profile SDR software shall generate the OMPS NP Science SDR, conforming to the XML format file in Attachment A.1 of the JPSS Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).	F	SDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_113	The OMPS Nadir Profile SDR software shall generate the OMPS Nadir Profile Science SDR geolocation in conformance with the XML format file in Attachment A.4 of the JPSS Algorithm Specification Vol II: Data Dictionary for OMPS NP RDR/SDR (474-00448-02-05).	Fg	GEO	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_89	The OMPS Nadir Profile SDR software shall report for each <FlagScope> quality flags using	Q	SDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA

Req ID	SRS 05 - Ozone Mapping and Profiler Suite-Nadir Profile	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM	Block 2.2.0 VM
	<FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for OMPS NP RDR/SDR (474-00448-04-05) <NP_Science_SDR><QF>.									
SRS.01.05_326	The OMPS Nadir Profile SDR GEO software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the SRSPF <NP_Sci_GEO><QF>.	Q	GEO	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_335	The JPSS Common Ground System shall execute the OMPS NP earth-view radiance computing algorithm.	Ai	SDR	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA
SRS.01.05_337	The JPSS Common Ground System shall execute the OMPS NP geolocation algorithm.	Ai	GEO	S-NPP JPSS-1 JPSS-2	CGS	2.0.0	3.0.0	Inspection	NA	NA